



HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

**NASA TECHNOLOGY INFUSION**

# ROAD TOUR



AND MINORITY-SERVING INSTITUTIONS

## Nevada State College

Andy Kuniyuki, Ph.D., Dean,  
School of Liberal Arts and  
Sciences



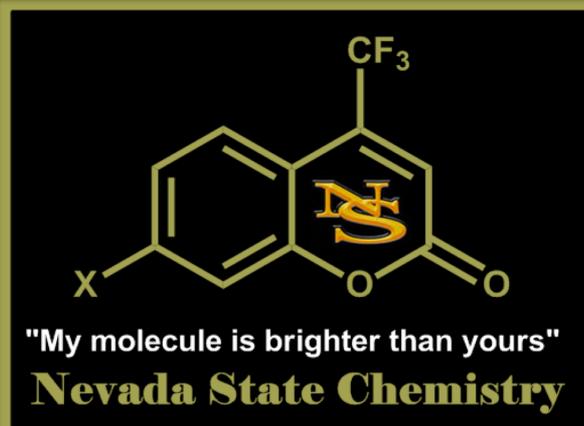
# Technology Infusion Road Tour Presentation Outline

- Bachelor of Science in Biology, Bachelor of Science in Environmental and Resource Science
  - Concentrations: Cell & Molecular, Ecology & Evolution, Physiology
  - Biology, Cell Processes, Genetics, Evolution, Molecular Biology, Immunology, Endocrinology, Mammalian Physiology, Ecology, (Inorganic, Organic, and Biochemistry), Physics, Statistics
  - Environmental Science, Geology, Geographic Information System, Hydrology, Soils, Conservation Biology, Pollution, Desert Plants, Environmental Measurements & Analysis, Environmental Regulations, Law & Methods

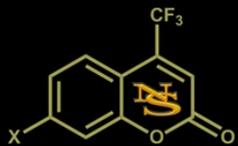
# Technology Infusion Road Tour Presentation Outline

- Accomplishments
  - Created a new tool in Medicinal Chemistry – published as Juana Garcia, Jacob Sorrentino, Emily J. Diller, Daniel Chapman & Zachary Woydziak (2016) General method for nucleophilic aromatic substitution of aryl fluorides and chlorides with dimethylamine using hydroxide-assisted decomposition of N,N-Dimethylformamide, *Synthetic Communications*, 46:5, 475-481
  - Stabilized red fluorophore against photo bleaching

# Nevada State College



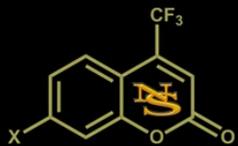
Zachary Woydziak, Ph.D.



# Why Nevada State College?

- Supportive and Exciting Collegial Environment
- Teaching Focused
- Work with Diverse Groups
- Research with Undergraduate Students
- Build an Effective Chemistry Degree Program



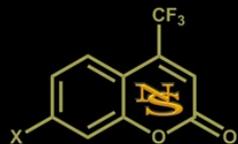


# Teaching at NSC

Going beyond the normal classroom experience:

- Study Group Sessions
- Challenge Problems
- Trophy of Glory
- Firsthand use of “expensive” equipment





# Research at NSC

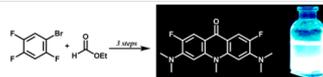
- Strong Undergraduate Research Program
- Primary Goal – To prepare students for professional programs and careers.



## Synthesis of a Fluorescent Acridone Using a Grignard Addition, Oxidation, and Nucleophilic Aromatic Substitution Reaction Sequence

Samuel Goodrich, Miloni Patel, and Zachary R. Woydziak\*  
 Department of Biology Nevada State College, Henderson, Nevada 89002, United States  
*J. Chem. Educ.* 2015, 92 (7), pp 1221–1225  
 DOI: 10.1021/acs.jchemeduc.5b009574  
 Publication Date (Web): April 30, 2015  
 Copyright © 2015 The American Chemical Society and Division of Chemical Education, Inc.  
 \*E-mail: zachary.woydzak@nsc.edu

### Abstract



A three-step synthesis oriented for an undergraduate organic chemistry laboratory was developed to construct a fluorescent acridone molecule. This laboratory experiment utilizes Grignard addition, nucleophilic aromatic substitution, and iterative nucleophilic aromatic substitution to transform the starting materials into the final product. Each of the intermediates and the acridone product can be synthesized using common techniques available in most undergraduate chemistry laboratories. The synthesis is characterized by its simplicity, low cost, and safety. The final product is characterized by point, thin-layer chromatography, infrared spectroscopy, UV–vis spectroscopy. Yields for each transformation in the synthesis are 20–40%, and nearly all of the students (>90%) who attempted to synthesize the final acridone product.

DOI: 10.1080/00397171.2016.1147051  
 Susana Garcia\*, Jacob Sorrentino, Emily J. Dille\*, Daniel Chapman\*, Zachary R. Woydziak\*  
 Publishing events and article dates explained  
 Accepted author version posted online: 09 Feb 2016

**Original Articles**  
 A general method for nucleophilic aromatic substitution of aryl fluorides and chlorides with dimethylamine using hydroxide-assisted decomposition of N,N-dimethylformamide

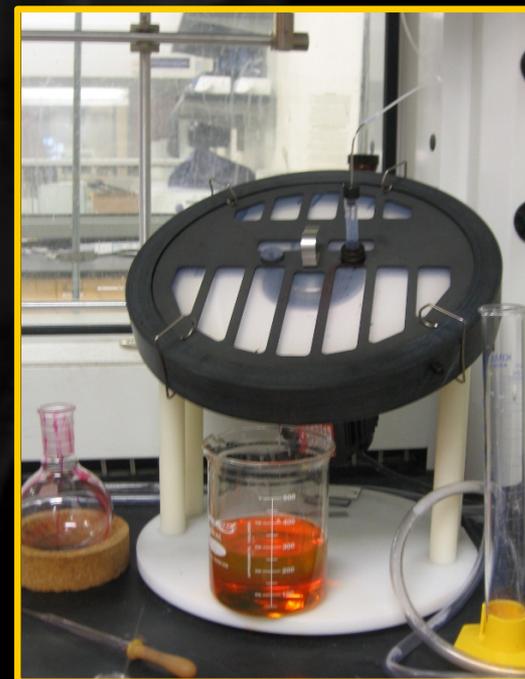
EWG  
 $\text{X} = \text{F or Cl}$

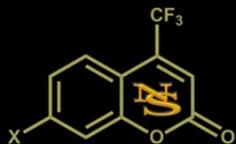
DMF, KOH  
 95 °C  
 44–93%  
 14 examples

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**Abstract**  
 A practical and convenient procedure for the nucleophilic aromatic substitution of aryl fluorides and chlorides with dimethylamine was developed using a hydroxide-assisted, thermal decomposition of N,N-dimethylformamide. These conditions are tolerant of nitro, nitrile, aldehyde, ketone, and amide groups but will undergo acyl substitution to form amides for methyl esters and acyl chlorides. Isolated yields of the products range from 44–98% with the majority being greater than 70% for seventeen examples.





# Student Successes

<u>Position</u>	<u>Former Student(s)</u>
<b>Medical School</b>	Emily Diller (M.D. program), Crystal Lake (M.D. program), Jenny Reategui (D.O. Program)
<b>Graduate School</b>	Lynda Burns (Ph.D. program), Samuel Bassong (Ph.D. program), Maya Zawlodzki (Ph.D. program), Jacob Sorrentino (Ph.D. program), Juana Garcia (Ph.D. program)
<b>Pharmacy School</b>	Noce Nayigihugu, Cheyenne Santee, Heungil Lee, Katrina Peninoy, Sampson Biru, Jed Anisco, Christian Heilman, Najma Ali, Waraluck Ogawa
<b>Veterinarian School</b>	Danielle Thomas
<b>Dental School</b>	Alex Audrus, Jihoon Kim
<b>Other Positions</b>	Nicole Vita (Research tech - St. Jude), Samuel Goodrich (Acting Director of the Student Academic Center at NSC)

